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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

12-12-86

In Re Application of
DANIEL BOEHLER

Serial No.: 740,297

Group Art Unit: 262

Filed: 31 May 1985

Examiner: D. Harvey

For: ELECTRONIC STILL STORE
WITH HIGH SPEED SORTING
AND METHOD OF OPERATION

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RESPONSE UNDER 37 CFR 1.10EXPEDITED PROCEDUREEXAMINING GROUP 262

Kathy E. McKenna
(Typed or Printed Name of Person Mailing Paper or Fee)

Kathy E. McKenna
(Signature of Person Mailing Paper or Fee)

Box AF
The Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

In response to the Office Action mailed 3 September
1985, please enter the following amendment.

In the Specification

At page 1, line 11 after "may" and before "be", delete
"than" and substitute --then--.

At page 2, line 25, delete "positioned reduce" and
substitute --positioned, reduced--.

At page 5, line 1, delete "REFERRED" and substitute
--preferred--. At line 27, delete "fourth" and
substitute --forth--.

At page 6, line 4, insert after "22" and before "is"
--, which in the preferred embodiment is a random access
memory.--. At line 8, after "24" and before "." insert
--in the preferred embodiment but which can be any bulk
storage memory device in other embodiments--

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At page 7, line 9, delete "resolutioncopy" and substitute --resolution copy--. At line 16, delete "usedin" and substitute --used in--. At line 19, delete "continous" and substitute --continuous--.

At page 8, line 7, delete "take" and substitute --taken--. At line 6, after "array" and before "within" insert --as a mosaic which fits--.

In the Drawings

Please approve the drawing change marked in green on the enclosed sketch.

In the Claims:

2. (Twice Amended) An electronic still store system comprising:

an image store means for [retrievable] retrievably storing therein a plurality of image frame copies of video frames [of video images]. the image frame copies comprising data representing a full spatial resolution image [frame copy] and [a] corresponding data representing a reduced spatial resolution image [frame copy] of each frame of video [images] data;

a frame store means which is operable in a first mode [to receive and store] for receiving and storing one of said full spatial resolution images [frame copies] from [the] said image store means and for repetitively [generate] generating a full spatial resolution [output] image [frame] output and operable in a second mode [to receive] for receiving from the image store means and [store] storing a plurality of said reduced spatial resolution images [image frame copies] each at selectively located different positions, the frame store means being further operable in the second mode [to] for repetitively generating [generate a reduced spatial resolution] output

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image [frame having an image frame] comprising [a] the stored plurality of said reduced spatial resolution images [image frame copies selectively located at different positions within the output image frame]; and

a size reducer means [coupled to receive] for receiving from the frame store [a] the stored full spatial resolution image [frame copy] and in response thereto [to return] returning to the frame store means a corresponding reduced spatial resolution image [frame copy] and wherein the frame store is operable [to receive and store] for receiving and storing the corresponding reduced spatial resolution image [frame copy] while continuing to store the stored full spatial resolution image [frame copy].

3. (Twice Amended) The electronic still store system according to claim 2 [above], wherein the corresponding reduced spatial resolution image [frame copies] each have a spatial resolution of [one-fourth] one-fourth the spatial resolution of the corresponding full spatial resolution image [frame copies in each dimension].

4. (Twice Amended) The electronic still store system according to claim 2 [above], [further comprising] wherein said frame store means includes a central processing unit, controlled by an operator, coupled and operable in said first mode to select which of said [image frame copies] full spatial resolution images stored in said image store means are to be retrieved from the image store means and coupled and operable in said second mode to select which of said reduced spatial resolution images stored in said image store means are to be retrieved and stored in said frame store means and to select the [location] different positions within the frame store means at which each of

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said retrieved [image frame copies] reduced spatial
resolution images is stored.

Please cancel claim 5.

6. (Twice Amended) The electronic still store system according to claim [5 above] 4, wherein said frame store means further [comprising] comprises an output digital-to-analog converter coupled to receive [said] output image data [frames] from the [the] frame store means and in response thereto to generate an analog video signal representing the received output image [frames]; and

a monitor coupled to receive the analog video signal and display the output image [frames] represented thereby.

7. (Twice Amended) The electronic still store system according to claim 6 [above], further comprising a video input means for generating an input analog video signal representing [a sequence of] an input video image [frames] and an analog-to-digital converter coupled between the video input means and the frame[s] store means [and] for converting the input analog video signal to a digital form [in which] such that digital data representing said input video image frame [can be] is received and stored by the frame store means.

Please cancel claims 8 through 14.

15. (Amended) A video still store system comprising:
a size reducer coupled to receive a full size image data set representing a full size image frame and to produce a reduced size image data set representing a corresponding reduced size image frame in response thereto;

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an image store for storing a plurality of said full size image data sets representing a plurality of full size image frames and for storing a plurality of corresponding reduced size image data sets representing a plurality of reduced size image frames, each of said reduced size image data sets corresponding to one of said full size image data sets; and

a frame store means coupled to selectively receive from either an external source or said image store and store one of said full size image data sets, said frame store [is] being operable such that when a full size image data set is received from an external source or is received from said image store and said image store does not contain a corresponding reduced size image data set, said frame store outputs a copy of said full size image data set to said size reducer and [in response thereto] receives a corresponding reduced size image data set which is outputted to said image store for storage with the corresponding full size image data set.

Please add new claims 16-28.

16. An apparatus for storing video images as pixel data comprising:

means for receiving and storing in a first memory pixel data representing video images having a first resolution, and for generating from said pixel data representing said video image at said first resolution pixel data representing a corresponding image having a second, lower resolution and for storing said second resolution image data with said first resolution image data in a second memory; and

means for selectively accessing either said data for the image at its first resolution or only the

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corresponding image data at said second resolution for any image stored in said bulk storage memory for further processing.

17. The apparatus of claim 16 wherein said means for selectively accessing allows access to a plurality of images at said second resolution and storage of them in selected blocks of memory in said first memory so that they may be further processed as a mosaic of reduced size images.

18. An apparatus for storing video pixel data representing video images of a first resolution and, for each image at a first resolution a corresponding video image at a second resolution comprising:

random access memory means for storing video pixel data representing a full size image at said first resolution and a corresponding reduced size version thereof at a second resolution;

means for storing one at a time in said random access memory means a plurality of said full size images;

memory means for receiving video pixel data from said random access memory means and for storing said full size images and the corresponding reduced size images received from said random access memory means and for outputting, upon a user's command, a selected full size image or only the corresponding reduced size image for the selected full size image for storage in said random access memory means;

means for generating said corresponding reduced size image from any said full size image in said random access memory means to be transferred to said memory means and for storing the video pixel data representing said reduced size image in said random access memory means prior to

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storage of the contents of said random access memory means in said memory means.

19. An apparatus for storing video data as full size image and reduced size image of pixel data comprising:

random access memory means for storing video pixel data presented at an input port and having at least one output port;

means for storing video pixel data representing a full size video image at a first resolution in a first group of memory locations in said random access memory means;

bulk storage memory for storing video pixel data and for presenting selected blocks of video data at said input port for storage by said random access memory;

size reducing means coupled to said random access memory means for accessing said image video pixel data stored in said random access memory representing said full size image at said first resolution, and for reducing said image to a reduced size counterpart image at a second, lower resolution and for storing said reduced size image at said second resolution in said random access memory in a second group of storage locations therein; and

control means coupled to said random access memory means, said bulk storage means and to said size reducing means for causing said size reducing means to generate said reduced size image at said second resolution and to store same in said random access memory means in said second group of storage locations each time the video pixel data from said random access memory means is to be transferred to said bulk storage means for storage, and for causing the video pixel data from both said first and second plurality of memory locations in said random access memory means to be transferred to said bulk storage means for storage after said reduced size image is generated and

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stored in said second group of storage locations, and for causing selective transfer of video pixel data from said bulk storage means into said random access memory means for storage such that either said first resolution image or only the reduced size second resolution counterpart are transferred into said random access memory means.

20. The apparatus of claim 19 wherein said control means also is coupled for causing selective transfer of said second resolution image directly from said size reducing means into said bulk storage means.

21. The apparatus of claim 19 wherein said control means also is coupled for controlling the memory locations in said random access memory means where the video pixel data defining said second resolution image are stored upon transfer from said bulk storage means.

22. The apparatus of claim 21 wherein said size reducing means produces said second resolution image with 1/16th the resolution of said first resolution image and wherein said control means is coupled for causing transfer of said second resolution image into said random access memory for storage at a selected one of 16 predetermined blocks of memory locations.

23. A system for storing and retrieving video data representing video images which are displayed as rasters of vertically distributed horizontal lines, each represented video image normally occupying a raster of selected vertical and horizontal size, the system comprising:

a video image size reducer having an input coupled to receive video data representing a video image

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corresponding to a selected raster size and generate therefrom at an output video data representing a reproduction of said video image corresponding to a selected fractional-size of said selected raster size;

a first store having an input for receiving video data for storage and an output for providing video data retrieved from storage, said first store having a capacity for storing video data representing a video image corresponding to of the selected raster size together with video data representing a reproduction of a video image corresponding to the selected fractional-size of said selected raster size;

a second store having an input for receiving video data for storage and an output for providing video data retrieved from storage, said second store having a capacity for storing video data representing a plurality of video images each corresponding to a video frame of the selected raster size and video data representing the reproduction of each video image of selected fractional size of said selected raster size; and

means for selectively transferring from said first store to said second store either said video data representing a video image corresponding to the selected raster size or said video data representing a reproduction of a video image which is the selected fractional size of said selected raster size.

24. A method of storing video pixel data comprising:
receiving data for a full size image at a first resolution and generating therefrom data representing a reduced size reproduction image at a second, lower resolution;

storing both the full size and the reduced size image in a bulk storage medium; and

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selectively accessing either the full size or said reduced size image from said bulk storage medium.

25. The method of claim 24 further comprising the steps of storing a plurality of full size images and their reduced size reproduction images and accessing a plurality of selected reduced size images and storing them in selected blocks of storage locations in a random access memory.

26. The method of claim 24 wherein each full size image occupies upon display a raster of selected vertical and horizontal size, and further comprising the steps of storing a plurality of full size images and their reduced size reproduction images and accessing a plurality of selected reduced size images and storing them in a random access memory and outputting the group of stored reduced size reproduction images as a mosaic of reproduction images occupying a raster of the selected vertical and horizontal size.

27. A method of storing video pixel data comprising: receiving and storing in random access memory video pixel data comprising a full size image;

generating therefrom video pixel data representing a reproduction thereof in the form of a reduced size image at a lower resolution from the full size image data and storing the pixel data representing the reduced size image so generated in additional storage locations in said random access memory along with the full size image;

storing both the full size and the reduced size image in bulk storage memory;

selectively transferring either the full size image or the reduced size image from said bulk storage memory means

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into said random access memory means for further processing.

28. A video still store system comprising:

an image store for storing full size image data sets representing a plurality of full size images and for storing a plurality of reduced size image data sets representing a plurality of reduced size images, each of said reduced size image data sets corresponding to one of the full size image data sets;

an external source input for receiving from an external source full size image data sets;

✓ a memory for simultaneous storage of one of said full size image data sets and the corresponding one of said reduced size image data sets;

a size reducer means for receiving from said memory the stored one of said full size image data sets, and for producing and returning to said memory the corresponding reduced size image data set;

said memory being coupled and operative to selectively receive from either the external source input or the image store and to store said one of said full size image data sets, and to output as an output image the stored one of said full size image data sets, and to communicate to the size reducer the stored one of said full size image data sets, and to receive from the size reducer and to store the corresponding reduced size image data set, and to provide to the image store both the stored one of said full size image data sets and the corresponding reduced size image data set, and to receive from the image store and to store at different selected locations selected ones of said plurality of reduced size image data sets, and to output as said output image the stored selected ones such that the selected ones are disposed at different locations

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within the output image or to receive and store from said image store only a full sized image data set; and means to retrieve data from said memory and display it on a raster scanned video display.

REMARKS

The undersigned thanks the Examiner for the courtesy of the telephone interview. In response to the discussions therein of new claims written by the undersigned, said new claims are submitted herewith for examination based on the substance of the interview. Further, some of the now pending claims have been retained and amended to eliminate the problems under 35 U.S.C. Section 112 noted in the outstanding office action. New claim 28 is the Examiner's suggested rewrite of claim 9 with some minor changes in terminology and one additional element. We would like to add that this claim is a very good claim. We thank the Examiner for taking the time to write it.

New claims 16 through 28 are in accord with the novelty identified by the Examiner in the first Office Action in the parent of the above identified U.S. patent application. Based upon the content of the Hugh Boyd, Quantel reference, which teaches accessing from disk the entire full size picture before size reduction can occur, these new claims are believed to be allowable. This is so because they teach storing a reduced image with the full size image each time a full sized image is to be stored from the frame buffer to the disk. This allows the user the option of retrieving the entire full size image or only the reduced size counterpart from disk. Mosaics of reduced size counterpart images may be made by accessing several reduced size images and moving them around in the frame buffer. The access time for each reduced size image

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is only a fraction of the access time for the entire full size image. This system obviously has a major advantage over the Boyd, Quantel system in that access time for a frame comprised of one or more reduced images will be substantially shorter than the Boyd, Quantel system can provide. This is because the Boyd, Quantel reference does not store a reduced image automatically with the full size counterpart each time a full size image in the frame buffer is to be stored on disk. Thus to access any particular reduced image, the entire full size image must be accessed and loaded into the size reducer. Clearly this takes more time than accessing only the data describing the reduced size image from the disk.

Respectfully submitted,
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20 November 1986
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PATENT

Group Art Unit: 262
 Examiner: D. Harvey
 Attorney Docket No.:
 AV-3033 N2

#20/H
 Holland
 5-13-88

In re application of
 Daniel A. Beaulier
 Serial No.: 018,786
 Filed: February 24, 1987
 For: ELECTRONIC STILL STORE
 WITH HIGH SPEED SORTING
 AND METHOD OF OPERATION

I hereby certify that this correspondence is being
 deposited with the United States Postal Service as
 first class mail in an envelope addressed to:
 Commissioner of Patents and Trademarks, Washin-

ton, D.C. 20231, on April 26, 1988 *gpe*

George B. Almeida 4/26/88

George B. Almeida, Reg. # 20,696

DATE

AMENDMENT

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GROUP 262

Hon. Commissioner of Patents and Trademarks
 Washington, D.C. 20231

Dear Sir:

In response to the Office Action dated January 4, 1988, please amend the above-identified application as follows. Applicant includes herewith a Request for an Extension of Time of one month, and authorization for the payment of the requisite fee of \$56.00.

IN THE SPECIFICATION:

Page 2, line 11, change "Ditigal" to --Digital--;

Page 4, line 18, before "which" insert --in--; after "which" insert --the sole--;

line 19, delete "1";

line 22, change "FIGURE 1" to --the sole FIGURE--;

Page 5, lines 4-6, change "Apparatus and Method for Chroma Separation, AV-2883, by" to --the U.S.

Patent No. 4,675,876, issued September 22,

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1987 to--;;

line 7, before "which" insert --which is assigned

to the same assignee as this application,

and--;

line 18, change "An" to --The--; change "A/D" to

--A-D--;

line 28, change "afford" to --affords--;

Page 6, line 7, after "or" insert --from--;

line 21, after "initially" insert a comma ---,--;

line 22, after "contain" insert a comma ---,--;

line 23, after "resolution" delete the comma ---,--;

) after "image" insert a comma ---,--;

Page 7, line 5, after "copy" insert a comma ---,--;

line 22, delete "from";

Line 25, change "to form" to --, for forming--.

IN THE CLAIMS:I
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X. (thrice amended) An electronic still store system comprising:

an image store means for retrievably storing therein a plurality of image frame copies of video frames, the image frame copies comprising data representing [a] full spatial resolution images [image] and corresponding data representing [a] reduced spatial resolution images [image] of the [each frame of] video frames [data];[a] frame store means [which is operable in a first mode] for receiving and storing in a first mode one of

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said full spatial resolution images from said image store means and for repetitively generating a full spatial resolution image output, and [operable] in a second mode for receiving from the image store means and storing a plurality of said reduced spatial resolution images each at selectively located different positions, the frame store means [being further operable] in the second mode further [for] repetitively generating an image output [image] comprising the stored plurality of said reduced spatial resolution images; and

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[a] size reducer means for receiving from the frame store means the stored full spatial resolution image and in response thereto returning to the frame store means a corresponding reduced spatial resolution image [and], wherein the frame store means receives and stores [is operable for receiving and storing] the returned [corresponding] reduced spatial resolution image while continuing to store the stored full spatial resolution image.

2 (thrice amended) The electronic still store system according to claim 1, wherein the [corresponding] reduced spatial resolution images [image] each have a spatial resolution of one-fourth the spatial resolution of the corresponding full spatial resolution image.

3 (thrice amended) The electronic still store system according to claim 1, wherein said frame store means

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includes a central processing unit, controlled by an operator, coupled and operable] in said first mode for selecting [to select] which of said full spatial resolution images stored in said image store means is [are] to be retrieved from the image store means, and [coupled and operable] in said second mode for selecting [to select] which of said reduced spatial resolution images stored in said image store means are to be retrieved and stored in said frame store means, and further for selecting [to select] the different positions within a video [the] frame [store means] at which each of said retrieved reduced spatial resolution images is stored.

Claim 6, line 7, change "the received" to --an--.

Claim 7, line 9, delete "frame".

6.15. (twice amended) A video still store system comprising:

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external source means for supplying a full size image data set representing a full size image frame;
a size reducer coupled to receive the [a] full size image data set (representing a full size image frame) for producing therefrom [and to produce] a reduced size image data set representing a corresponding reduced size image frame [in response thereto]:

an image store for storing a plurality of [said] full size image data sets representing a plurality of full size image frames and for storing a plurality of [corresponding] reduced size image data sets representing a plurality of reduced size image frames, each of said reduced size image data sets corresponding to one of said full size image data sets; and

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cont

[a] frame store means for storing one of said full size image data sets [coupled to selectively receive] from either the [an] external source or said image store, wherein if [and store one of said full size image data sets, said frame store being operable such that when a full size image data set is received from an external source or is received from said image store and] said image store does not supply [contain] a corresponding reduced size image data set, said frame store outputs a copy of said full size image data set to said size reducer, and receives in turn a corresponding reduced size image data set;

wherein [which is outputted to] said image store stores the reduced size image data set along [for storage] with the previously stored corresponding full size image data set.

16. (amended) An apparatus for storing video images as pixel data comprising:

means for receiving and storing in a first memory pixel data representing a video image [images] having

a first resolution, and for generating from said pixel data representing said video image at said first resolution, pixel data representing a corresponding image having a second [] lower resolution; [and]

means for storing in a second memory said second lower resolution pixel [image] data together with said first resolution pixel [image] data [in a second memory]; and

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means for selectively accessing said first and second memories to supply either said pixel data for the video image at said [its] first resolution, or [only] said pixel data for the corresponding image [data] at said second resolution, [for any image stored in said bulk storage memory] for further processing.

17. (amended) The apparatus of claim 16 wherein said means for selectively accessing allows access to a plurality of sets of pixel data [images] at said second resolution [and storage of them] in selected groups [blocks] of memory locations in said first memory wherein the pixel data at said second resolution simultaneously is [so that they may be further] processed as a single composite mosaic of reduced size images.

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18. (amended) An apparatus for storing video pixel data representing video images of a first resolution and, for each of the images [image] at said [a] first

~~resolution, a corresponding video image at a second resolution comprising:~~

~~random access memory means for individually storing video pixel data representing one of a succession of full size images [image] at said first resolution and a corresponding reduced size version thereof at said [a] second resolution;~~

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~~[means for storing one at a time in said random access memory means a plurality of said full size images;]~~

~~memory means for receiving said video pixel data from said random access memory means and for storing said succession of full size images and the corresponding reduced size versions thereof, [images received from said random access memory means] and for outputting upon a user's command, either a selected one of the successive full size images [image] or only the corresponding reduced size versions thereof [image for the selected full size image] for storage back in said random access memory means;~~

~~means for selectively generating one of said corresponding reduced size versions [image] from the respective [any said] full size image in said random access memory means, [to be transferred to said memory means] and for transferring [storing] the video pixel data representing said reduced size image to [in said random access memory means prior to storage of] the contents of said memory means via said random access memory means [in said memory means].~~